

FLASHRAD: A 3D Rad Hard Memory Module For High Performance Space Computers, Phase I

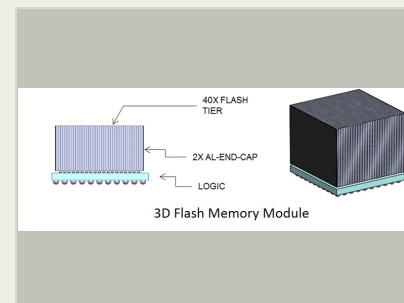
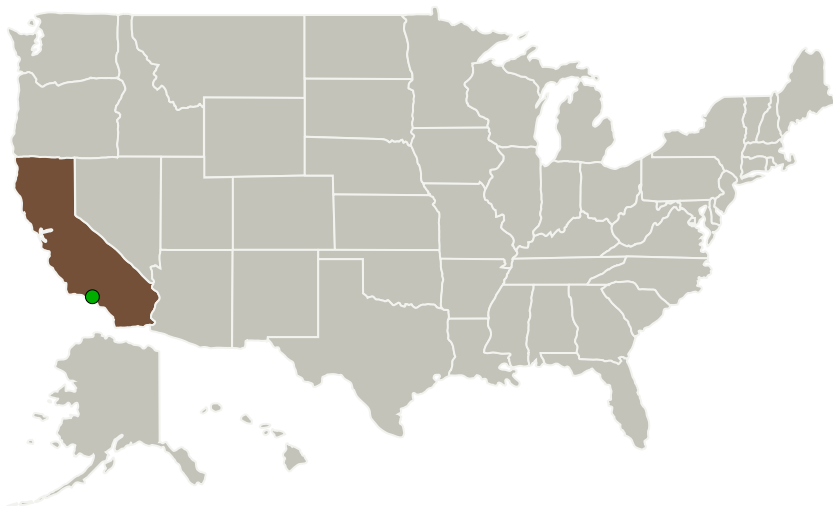
Completed Technology Project (2017 - 2017)



Project Introduction

The computing capabilities of onboard spacecraft are a major limiting factor for accomplishing many classes of future missions. Although technology development efforts are underway that will provide improvements to spacecraft central processing units (CPUs) they do not address the limitations of current onboard memory systems. In addition to CPU upgrades, effective execution of data-intensive operations such as terrain relative navigation, hazard detection and avoidance, autonomous planning and scheduling, and onboard science data processing and analysis require high-bandwidth, low-latency memory systems to maximize processor usage (i.e. to overcome the "memory wall"). Copious amounts of data being generated on a mission require large amounts of non-volatile memory storage in order to store this data for transmission back to earth when power to do this operation is available. Furthermore, the memory system must be capable of providing the necessary operational robustness and fault tolerance required for space applications. In an effort to support the needs for NASA's High Performance Space Computer (HPSC), it is proposed that this research investigates the challenges and opportunities in developing a space-qualified, 3D Flash memory cube utilizing COTS memory devices supplemented with a custom Radiation-Hardened-By-Design (RHBD) controller. Focus would be on developing a NAND Flash memory module that could be used for SSRs to help increase the memory densities, lower power, lower cost and to achieve higher data throughput.

Primary U.S. Work Locations and Key Partners



FLASHRAD: A 3D Rad Hard Memory Module For High Performance Space Computers, Phase I Briefing Chart Image

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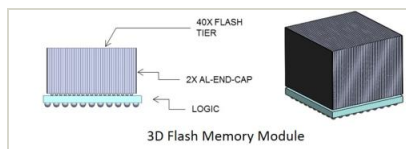


Organizations Performing Work	Role	Type	Location
Irvine Sensors Corporation	Lead Organization	Industry	Costa Mesa, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Images



Briefing Chart Image

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(<https://techport.nasa.gov/image/127616>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Irvine Sensors Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

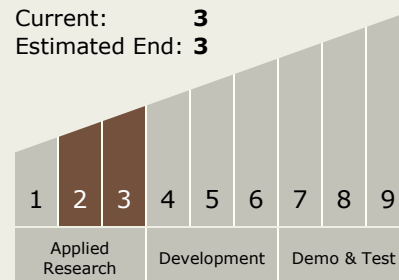
Carlos Torrez

Principal Investigator:

James Yamaguchi

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



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Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.1 Avionics Component Technologies
 - └ TX02.1.4 High Performance Memories

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System